

Work Order ID 102891

~~U/R~~

\*102891\*

Page 1

June-12-13 9:16:13 AM

Item ID: 646.3511

Accept

\*N900040100\*

Setup

Start

\*NS1\*

Revision ID:

Stop

\*NS2\*

Item Name: Strut

Start Date: 6/11/13 Start Qty: 10.00 \*10\*

Cust Item ID:

Required Date: 6/11/13 Req'd Qty: 10.00 \*10\*

Customer:

Reference:

Approvals: Process Plan: M65 Date: 13-06-14 Tooling: Date: Run Start \*NR1\*  
QC: Date: SPC (Y/N): Date: Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr								
646.3500	N/C U/R	UP 13/6/17	0.00						
110									

\*110\*

Waterjet

FLOW CNC Waterjet

Memo: 0.00

1-Cut 646.3500 plate 2.75"x 1.50" as per Dwg

Dwg Rev: N/C

Prog Rev: N/C

2-Deburr if necessary

120

QC2- Inspect parts off machine FAI/FAIB

0.00

\*120\*

QC

Quality Control

Memo: 0.00

10 0 Ae  
13-07-13

10 0 Ae  
13-07-13

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_

Date: \_\_\_\_\_

Work Order update only 

Work Order: _____	DISPOSITION	AGAINST DEPARTMENT/PROCESS					
Part No. _____	Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>		
NCR No. _____	Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>		
	Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>		
	Suspected Unapproved <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>			

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY									
Landing Gear	General								
	Bending	Bend	Folio/Program	Outside Dimensions	Pressure/Forced				
	Centre Not Concentric	BOM/Route	Grain	Over/Under tolerance	Set-up				
	Cracks	Broken/Damage/Defect	Hardware	Part Incorrect	Temperature/Cure				
	Crimp/Kink/Ripple/Wave	Burrs	Inspection Incomplete/Unqualified	Part Lost/Missing	Weld				
	Cuffs	Contamination	Instructions Incomplete/Unclear	Part Moved	Wrong Stock Pulled				
	Crushing	Countersink	Misaligned/off center	Positioned Wrong					
	Heat Treat	Cut Too Short	Mislabeled	Power Loss/Surge					
	Inspection Strip in Tube	Drawing	Misread						
	Marks/Chatter	Drill Holes	Off-set						
	Turning Sequence	Finish	Out of Calibration						
	Wave/Twist in Tube	Fit/Function	Out of Sequence						

Work Order ID 102891

\*102891\*

Page 2

June-12-13 9:16:13 AM

Item ID: 646.3511

Accept

\*N900040100\*

Setup

Start

\*NS1\*

Revision ID:

Item Name: Strut

Start Date: 6/11/13 Start Qty: 10.00

\*10\*

Cust Item ID:

Required Date: 6/11/13 Req'd Qty: 10.00

\*10\*

Customer:

Reference:

Approvals: Process Plan:

Date: Tooling:

Run

Start

\*NR1\*

QC:

Date: SPC (Y/N):

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

\*130\*

QC

Quality Control

QC8- Inspect parts - second check

0.00

DAS  
27.15

10

140

\*140\*

Small Fab

Memo

0.00

10

62

13-7-3.0

Small Fab

1- Fabricate tube as per dwg

150

\*150\*

QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

(5)

13-07-30

DAS  
09  
08

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_

Date: \_\_\_\_\_

Work Order update only 

Work Order: _____	DISPOSITION			AGAINST DEPARTMENT/PROCESS					
Part No. _____	Rework	Scrap	Use-as-is	Skid-tube	Crosstube	Water Jet	Engineering		
NCR No. _____	Suspected	Unapproved		Machining	Small Fab	Prod. Eng. Coor.	Quality		
				Thermoforming	Finishing	Rec/Store/Packaging	Other		
				Large Fab	Composite	Supplier			

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

## FAULT CATEGORY

Landing Gear		General									
Bending		Bend		Folio/Program		Outside Dimensions		Pressure/Forced			
Centre Not Concentric		BOM/Route		Grain		Over/Under tolerance		Set-up			
Cracks		Broken/Damage/Defect		Hardware		Part Incorrect		Temperature/Cure			
Crimp/Kink/Ripple/Wave		Burrs		Inspection Incomplete/Unqualified		Part Lost/Missing		Weld			
Cuffs		Contamination		Instructions Incomplete/Unclear		Part Moved		Wrong Stock Pulled			
Crushing		Countersink		Misaligned/off center		Positioned Wrong					
Heat Treat		Cut Too Short		Mislabeled		Power Loss/Surge		Other			
Inspection Strip in Tube		Drawing		Misread							
Marks/Chatter		Drill Holes		Off-set							
Turning Sequence		Finish		Out of Calibration							
Wave/Twist in Tube		Fit/Function		Out of Sequence							



DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_

Date: \_\_\_\_\_

Work Order update only 

Work Order: _____	DISPOSITION	AGAINST DEPARTMENT/PROCESS					
Part No. _____	Rework Scrap Use-as-is Suspected Unapproved	Skid-tube Machining Thermoforming Large Fab	Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier	Engineering Quality Other		
NCR No. _____							

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

### FAULT CATEGORY

Landing Gear	General	Fault Category	Other
Bending	Bend	Folio/Program	Outside Dimensions
Centre Not Concentric	BOM/Route	Grain	Over/Under tolerance
Cracks	Broken/Damage/Defect	Hardware	Part Incorrect
Crimp/Kink/Ripple/Wave	Burrs	Inspection Incomplete/Unqualified	Part Lost/Missing
Cuffs	Contamination	Instructions Incomplete/Unclear	Part Moved
Crushing	Countersink	Misaligned/off center	Positioned Wrong
Heat Treat	Cut Too Short	Mislabeled	Power Loss/Surge
Inspection Strip in Tube	Drawing	Misread	Other
Marks/Chatter	Drill Holes	Off-set	
Turning Sequence	Finish	Out of Calibration	
Wave/Twist in Tube	Fit/Function	Out of Sequence	

Work Order ID 102891

\*102891\*

Page 4

June-12-13 9:16:13 AM

Item ID: 646.3511

Accept

\*N900040100\*

Setup Start

\*NS1\*

Revision ID:

Stop

\*NS2\*

Item Name: Strut

Start Date: 6/11/13 Start Qty: 10.00

\*10\*

Cust Item ID:

Required Date: 6/11/13 Req'd Qty: 10.00

\*10\*

Customer:

Reference:

Run Start

\*NR1\*

Approvals: Process Plan:

Date:

Tooling:

Date:

Stop

\*NR2\*

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

190

\*190\*

Outsource4

Outsource process - Anodize

Outsource process-Anodize per QSI017 4.1.10.1

0.00

Memo

0.00

Issue P/O:  
Anodize as per dwg

200

\*200\*

Packaging

Packaging

Receive & Inspect for Damage & Mat'l Certs

0.00

Memo

0.00

0.00  
0.00  
GS

210

\*210\*

QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

0.00

ST

10X →

10X →

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only 

Work Order: _____	DISPOSITION			AGAINST DEPARTMENT/PROCESS				
Part No. _____	Rework	Scrap	Use-as-is	Skid-tube	Crosstube	Water Jet	Engineering	
NCR No. _____	Suspected	Unapproved		Machining	Small Fab	Prod. Eng. Coor.	Quality	
				Thermoforming	Finishing	Rec/Store/Packaging	Other	
				Large Fab	Composite	Supplier		

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

## FAULT CATEGORY

Landing Gear		General									
Bending		Bend		Folio/Program		Outside Dimensions		Pressure/Forced			
Centre Not Concentric		BOM/Route		Grain		Over/Under tolerance		Set-up			
Cracks		Broken/Damage/Defect		Hardware		Part Incorrect		Temperature/Cure			
Crimp/Kink/Ripple/Wave		Burrs		Inspection Incomplete/Unqualified		Part Lost/Missing		Weld			
Cuffs		Contamination		Instructions Incomplete/Unclear		Part Moved		Wrong Stock Pulled			
Crushing		Countersink		Misaligned/off center		Positioned Wrong					
Heat Treat		Cut Too Short		Mislabeled		Power Loss/Surge		Other			
Inspection Strip in Tube		Drawing		Misread							
Marks/Chatter		Drill Holes		Off-set							
Turning Sequence		Finish		Out of Calibration							
Wave/Twist in Tube		Fit/Function		Out of Sequence							

Work Order ID 102891

\*102891\*

Page 5

June-12-13 9:16:13 AM

Item ID: 646.3511

Accept

\*N900040100\*

Setup

Start

\*NS1\*

Revision ID:

Stop

\*NS2\*

Item Name: Strut

Start Date: 6/11/13

Start Qty: 10.00

\*10\*

Cust Item ID:

Required Date: 6/11/13

Req'd Qty: 10.00

\*10\*

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

220

\*220\*

SprayPaint

Spray Painting

0.00

10

0

0

13-8-14

230

\*230\*

QC

Quality Control

QC14- Inspect Spray Paint

0.00

10

(DAS)  
05  
9-88

13-08-15

240

\*240\*

Packaging

Packaging

0.00

16

(DAS)  
06  
9-88

13-08-15

Memo  
\*\*\*IDENTIFY AS PER APICAL MPP-120 BY STAMPING THE P# AND  
REV\*\*\*

ST 523

10x

4.11.13-08-15

DQA: \_\_\_\_\_

Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_

Date: \_\_\_\_\_

Work Order update only 

Work Order: _____	DISPOSITION	AGAINST DEPARTMENT/PROCESS							
Part No. _____	Rework Scrap Use-as-is Suspected Unapproved	Skid-tube Machining Thermoforming Large Fab	Crosstube Small Fab Finishing Composite	Water Jet Prod. Eng. Coor. Rec/Store/Packaging Supplier	Engineering Quality Other				
NCR No. _____									

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

### FAULT CATEGORY

Landing Gear	General	Folio/Program	Outside Dimensions
Bending	Bend	Grain	Over/Under tolerance
Centre Not Concentric	BOM/Route	Hardware	Part Incorrect
Cracks	Broken/Damage/Defect	Inspection Incomplete/Unqualified	Part Lost/Missing
Crimp/Kink/Ripple/Wave	Burrs	Instructions Incomplete/Unclear	Part Moved
Cuffs	Contamination	Misaligned/off center	Positioned Wrong
Crushing	Countersink	Mislabeled	Power Loss/Surge
Heat Treat	Cut Too Short	Misread	Other
Inspection Strip in Tube	Drawing	Off-set	
Marks/Chatter	Drill Holes	Out of Calibration	
Turning Sequence	Finish	Out of Sequence	
Wave/Twist in Tube	Fit/Function		

# Picklist Print

June-12-13 9:16:13 AM

Page 1

Work Order ID: 102891

Parent Item: 646.3511

Start Date: 6/11/13

Required Date: 6/11/13

Parent Item Name: Strut

Start Qty: 10.00

Required Qty: 10.00

Comments: IPP REV:A 12.10.19 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

M304S16GA

304/316 Sheet .063

Purchased

No

sf

280.7102

0.292632

126.159

→ 0.3

Ac 13-07-13

Location	Loc Qty	Loc Code
MAT020	280.7101686	
122245	0.1713688	
123136	140.8	
124428	23.61	
124572	7.0181688	
125599	109.110631	

M304TR0.500W.049

304 RD Tube .500 x .049W

Purchased

No

f

222.2197

8.768421

PL 13-7-30

Location	Loc Qty	Loc Code
GA	43.66	
120633	43.66	
MAT017	178.559716	
119087	0.000016	
123449	86.7597	
125513	91.8	

0.71  
6.375

DQA: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: \_\_\_\_\_

Date: \_\_\_\_\_

Work Order update only 

Work Order: _____	DISPOSITION	AGAINST DEPARTMENT/PROCESS							
Part No. _____	Rework <input type="checkbox"/>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>				
NCR No. _____	Scrap <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coor. <input type="checkbox"/>	Quality <input type="checkbox"/>				
	Use-as-is <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>				
	Suspected Unapproved <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>					

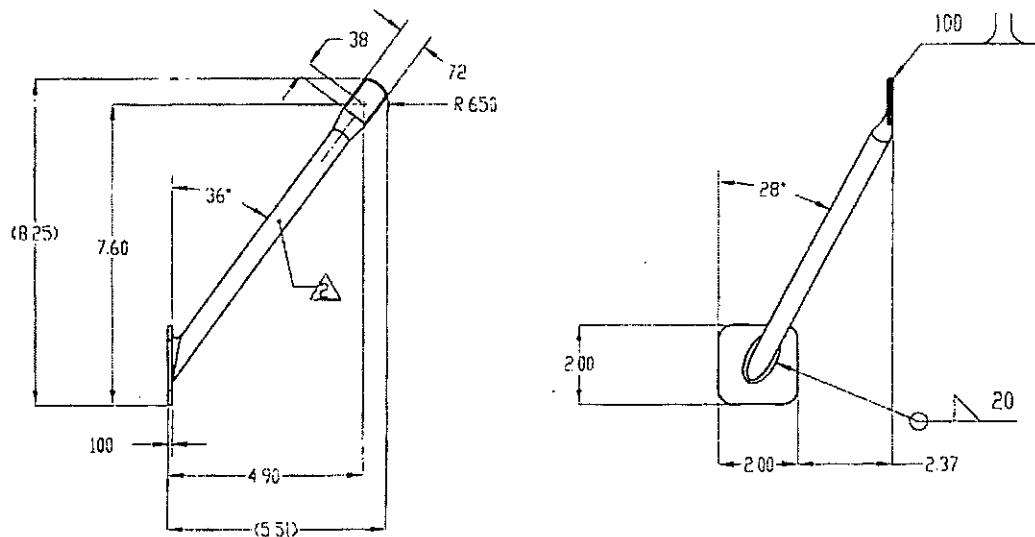
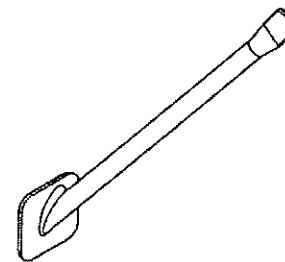
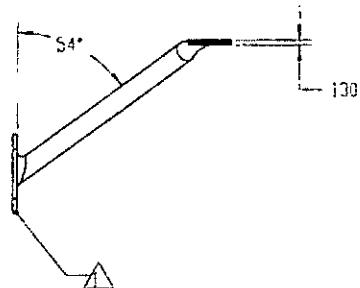
Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

### FAULT CATEGORY

Landing Gear	General									
Bending	Bend <input type="checkbox"/>	Folio/Program <input type="checkbox"/>	Outside Dimensions <input type="checkbox"/>	Pressure/Forced Set-up <input type="checkbox"/>						
Centre Not Concentric	BOM/Route <input type="checkbox"/>	Grain <input type="checkbox"/>	Over/Under tolerance <input type="checkbox"/>	Temperature/Cure <input type="checkbox"/>						
Cracks	Broken/Damage/Defect <input type="checkbox"/>	Hardware <input type="checkbox"/>	Part Incorrect <input type="checkbox"/>	Weld <input type="checkbox"/>						
Crimp/Kink/Ripple/Wave	Burrs <input type="checkbox"/>	Inspection Incomplete/Unqualified <input type="checkbox"/>	Part Lost/Missing <input type="checkbox"/>	Wrong Stock Pulled <input type="checkbox"/>						
Cuffs	Contamination <input type="checkbox"/>	Instructions Incomplete/Unclear <input type="checkbox"/>	Part Moved <input type="checkbox"/>							
Crushing	Countersink <input type="checkbox"/>	Misaligned/off center <input type="checkbox"/>	Positioned Wrong <input type="checkbox"/>							
Heat Treat	Cut Too Short <input type="checkbox"/>	Mislabeled <input type="checkbox"/>	Power Loss/Surge <input type="checkbox"/>							
Inspection Strip in Tube	Drawing <input type="checkbox"/>	Misread <input type="checkbox"/>								
Marks/Chatter	Drill Holes <input type="checkbox"/>	Off-set <input type="checkbox"/>								
Turning Sequence	Finish <input type="checkbox"/>	Out of Calibration <input type="checkbox"/>								
Wave/Twist in Tube	Fit/Function <input type="checkbox"/>	Out of Sequence <input type="checkbox"/>								

APICAL INDUSTRIES, INC.	ENGINEERING CHANGE NOTICE NO. 02440			SHEET 1 OF 1		
	DWG NO. 646.3500 REV: NC		PREPARED BY S. HUFF	DATE 06/08/09	EFFECT ON DWG <input type="checkbox"/> INC. <input checked="" type="checkbox"/> UNINC.	
	DWG TITLE: STRUT		APPROVED BY: ENGR <i>[Signature]</i>	MFG <i>[Signature]</i>	QC <i>[Signature]</i>	EFF: CURRENT ORDER AND STOCK <i>[Signature]</i>
	TRANSACTION CODES (TC) A-ADD C-CREATE R-REVISE D-DELETE	REASON: REVISED GEOMETRY TO ACCOMMODATE NEW EXISTING AIRCRAFT PROVISIONS				

SHEET 2 IS:



102891  
1306-14

DOCUMENTS EFFECTED:

MDL  INSTALL INSTRUC  ICA  FMS  BOM

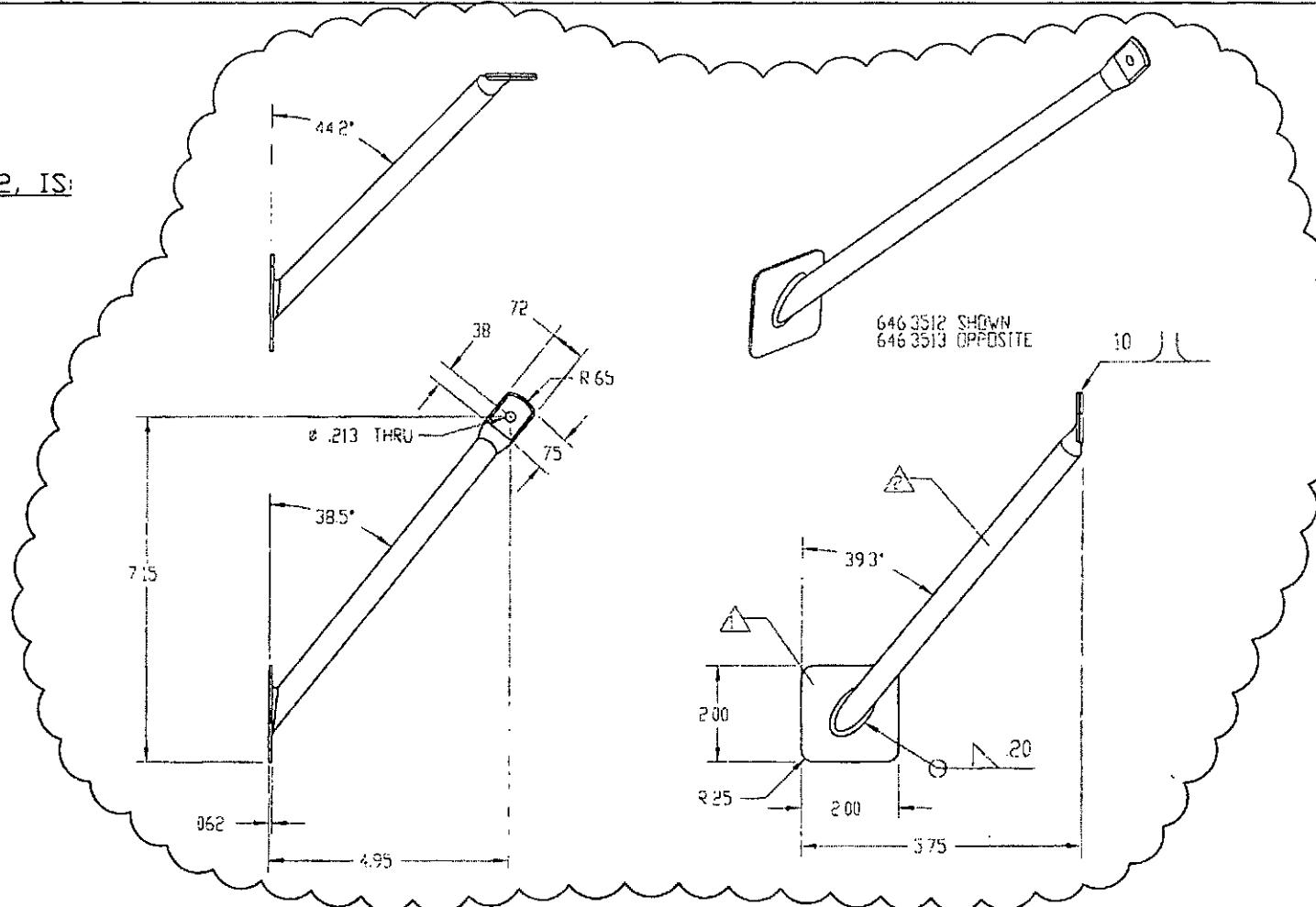
CHANGE CATEGORY  
 MAJOR  MINOR

DER REVIEW REQUIRED  
 YES  NO



APICAL INDUSTRIES, INC.	ENGINEERING CHANGE NOTICE NO. 02197			SHEET 1 OF 1	
	DWG NO. 646.3500	REV: N/C	PREPARED BY S. HUFF	DATE: 01/05/09	
	DWG TITLE: STRUT			EFFECT ON DWG <input type="checkbox"/> INC. <input checked="" type="checkbox"/> UNINC.	
	APPROVED BY: ENGR <i>P. Brown</i>	MFG <i>Paul Clark</i>	QC <i>S. Clark</i>	EFF: <i>S. Clark</i>	NEXT ORDER
TRANSACTION CODES (TC): A-ADD C-CREATE R-REVISE D-DELETE		REASON: REVISED ANGLE OF 646.3512 & 646.3513 FOR BETTER FITMENT			

SHEET 2, IS:



DOCUMENTS EFFECTED:	<input type="checkbox"/> MDL <input type="checkbox"/> INSTALL INSTRUC <input type="checkbox"/> ICA <input type="checkbox"/> FMS <input type="checkbox"/> BOM	CHANGE CATEGORY <input type="checkbox"/> MAJOR <input checked="" type="checkbox"/> MINOR	DER REVIEW REQUIRED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
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NOTES:

1 MATERIAL: 6061-T6 ALUMINUM IAW AMS-QQ-A-250/11;  
.062" THK.

2 MATERIAL: 6061-T6 ALUMINUM IAW AMS-WW-T-700/6  
.500" OD; .062" WALL THK

3 FINISH: HARD ANODIZE IAW MIL-A-8625 TYPE III, CLASS 2  
COLOR BLACK;  
CARDINAL 4860-50 PRETREATMENT PRIMER  
PRIME IAW MIL-P-23377J TYPE I CLASS N

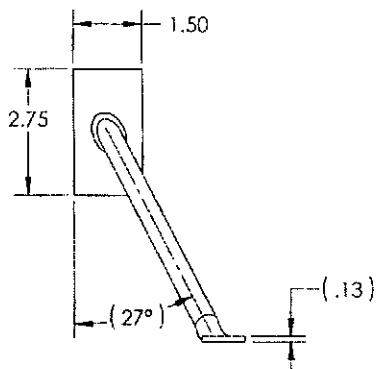
4. DEBURR AND BREAK ALL SHARP EDGES

5. WELDS IAW MIL-STD-2219.  
TIG WELD WITH FILLER ROD

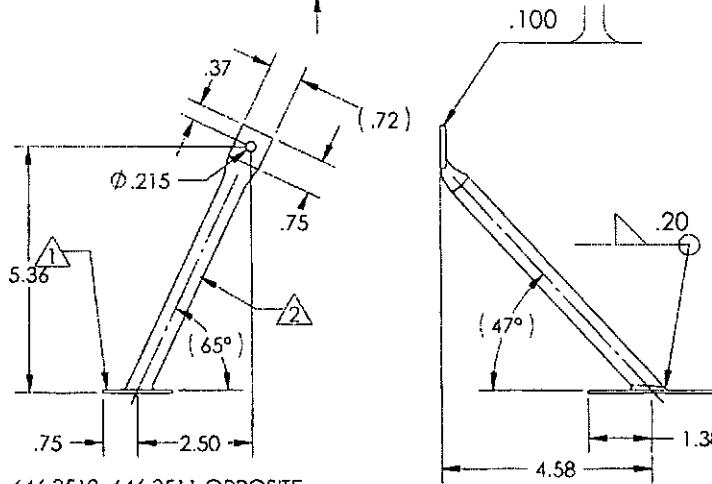
364 55 0.063 thick

<sup>2</sup> 304 ss seamless tube,  $\phi 0.500 \times 0.045$  wall

9/13/61 17



646.3510 SHOWN  
646.3511 OPPOSITE

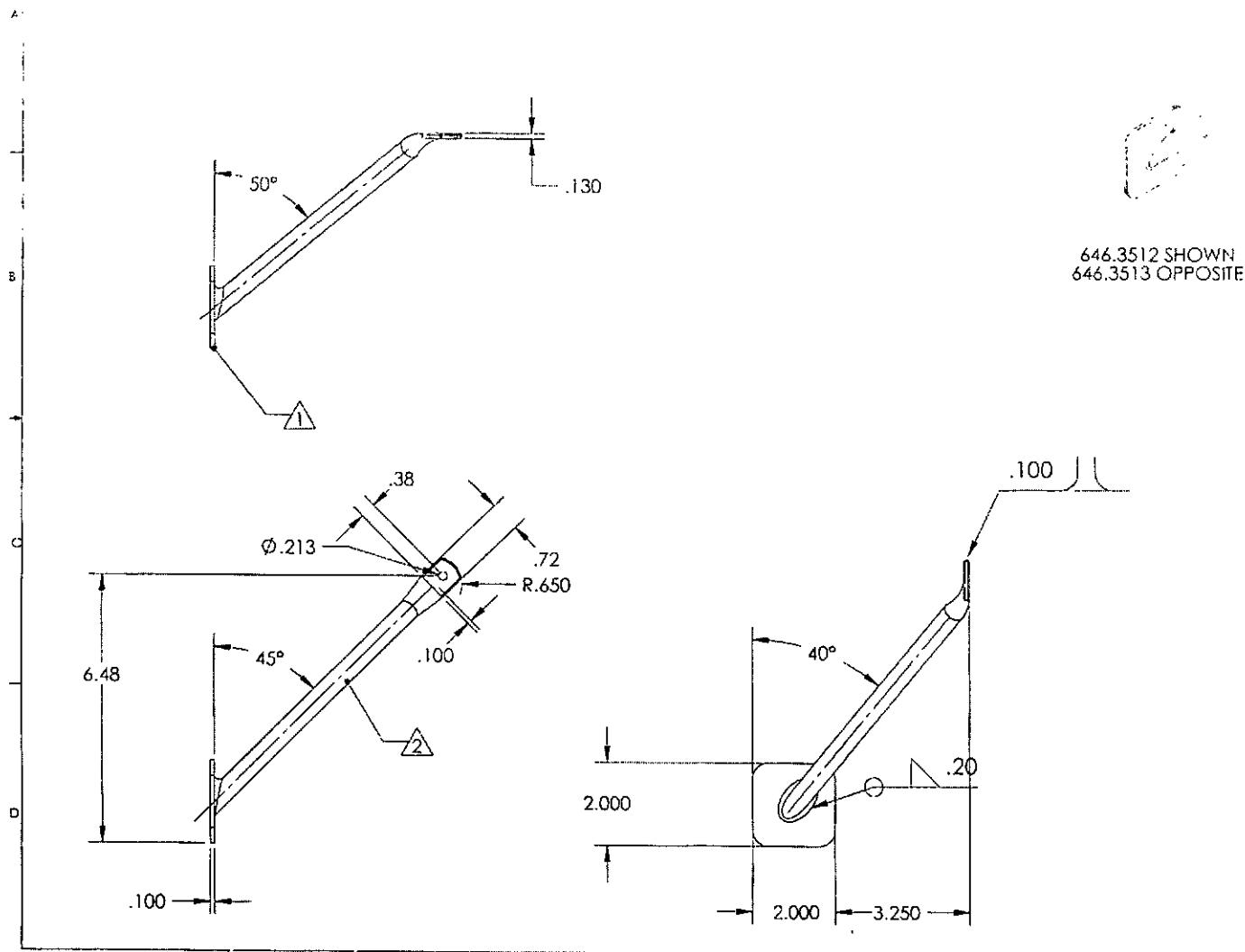


**UNINCORPORATED ECN(s)**

02197, 02440



102891





DART AEROSPACE LTD	Work Order:	102891
Description: STRUT	Part Number:	646.3500
Inspection Dwg: 646.3500 Rev: N/C		Page 1 of 1

## FIRST ARTICLE INSPECTION CHECKLIST

Measured by:	<i>Ak</i>	Audited by:	<i>✓</i>	Preliminary Approval:	
Date:	13.07.13	Date:	13.7.13	Date:	

Rev	Date	Change	Revised by	Approved
E	10.04.14	Added preliminary approval	KJ	

10.04.15

